discharge of his many official duties. He probably never left the Office with an official letter unanswered. Perhaps it was his methodical habits which led to a number of rather serious feuds in the small meteorological circle. Certainly they did exist, though Scott himself was a kindly and thoroughly clubbable man. He was a recognised leader of the Royal Society Club and took a leading part in the incorporation therewith of the Philosophical Club. He retained his connection with the Athenæum to the last. He was an energetic and useful member of the governing body of the South-Western Polytechnic.

Shortly after his retirement he had the great misfortune to lose his wife, who was a woman of strong personality and character, and very active in the management of workmen's dwellings in Chelsea. She was a daughter of the Hon. W. Stewart, Island Secretary, Jamaica. Shortly after her death Dr. Scott had a severe fall on the stairs of the Meteorological Society and injured the base of his skull, grimly remarking when he was recovering that if he had not been Irish the accident would have been fatal. But he never completely recovered from the effects, and for the later years of his life, though he preserved all the outward forms of business, he was not able to take an active part in it. He was buried at Peper Harrow, the seat of the Brodrick family, near Godalming, on Wednesday, June 21. NAPIER SHAW.

NOTES.

THE adjourned extraordinary general meeting of the Chemical Society, called to consider the question of the removal of the names of nine alien enemies from the list of honorary and foreign members, was held on June 21, Dr. Alexander Scott, president, in the chair. Prof. W. H. Perkin's amendment, which was carried on May 11, "That judgment be suspended until after the war, in accordance with the resolution of the former council," was the motion before the meeting. As an amendment to this it was proposed by Mr. J. L. Baker, and seconded by Mr. F. F. Renwick, "That the fellows of the Chemical Society hereby record their detestation of German malpractices in connection with the war, and whilst they refrain at the present time from attaching personal responsibility for the initiation of these to individual chemists, they desire to mark their protest by resolving that the names of the following alien enemies:—A. von Baeyer, T. Curtius, E. Fischer, C. Graebe, P. H. R. von Groth, W. Nernst, W. Ostwald, O. Wallach, and R. Willstätter, shall not appear in the list of honorary and foreign members so long as the war shall last, after which their position shall be reconsidered." After considerable discussion, this amendment was put to the meeting and was declared lost. Mr. John Hodgkin then proposed a second amendment in the following terms:—"The Chemical Society considers that it is neither compatible nor consistent with its loyalty to the Crown, whence the royal charter under which it works was derived, to retain any alien enemies upon its list of honorary and foreign members. It is therefore resolved that the names of A. von Baeyer, T. Curtius, E. Fischer, C. Graebe, P. H. R. von Groth, W. Nernst, W. Ostwald, O. Wallach, and R. Willstätter, who were elected under happier conditions in recognition of their eminent services to chemical science—for which the society still retains an undiminished appreciation and regard—be, and are, hereby removed from the list of honorary and foreign members." This was seconded by Dr. S. Russell Wells, and put to the meeting, and the president declared it as carried by 94 votes to 76. The amendment was afterwards carried as a substantive motion, and the meeting then ended.

DR. J. G. ANDERSSON, until lately head of the Geological Survey of Sweden, has accepted the task of organising, as director, a Geological Survey for China.

PROF. H. THÉEL has retired from his post as intendant of the collection of invertebrate animals at the Riksmuseum, Stockholm. Dr. E. W. Dahlgren, the State Librarian, has also retired on the completion of a specially extended term of service.

THE special correspondent of the *Times* at Port Stanley (Falkland Islands), in a message dated June 26, says:—"Sir Ernest Shackleton returned here yesterday. The relief ship got to about twenty miles off Elephant Island, but was unable to make its way further through the icebergs and floating masses of ice which surrounded the island. Winter conditions in the Antarctic this year are peculiarly severe, and a more powerfully equipped ship than that lent by the Uruguayan Government is needed to force a way to Elephant Island, and relieve the twenty-two men stranded there."

THE death of Mr. Frederick Enock removes a figure well known to the public as a popular lecturer on natural history. Few, however, realised the immense amount of time he devoted to original research, chiefly into the life-histories of insects. Of recent years he devoted himself largely to the study of the Mymaridæ, or "fairy flies," a group of very minute hymenopterous parasitic insects. In this group he discovered many new genera and species, and traced out the life-histories of not a few. Unfortunately, the results of most of these investigations have not yet been published. Mr. Enock's powers of manipulation, whether as draughtsman or mounter of microscopical objects, were of a high order. Originally intended for the engineering profession, his innate passion for Nature soon asserted itself, and his life was practically all devoted to work in natural history. He had suffered for some time from pernicious anæmia, and passed away at his home at Hastings in his seventieth year.

THOSE who are interested in rites of initiation will be attracted by a paper by the Rev. Noel Roberts on "The Bagananoa or Ma-laboch: Notes on their Early History, Customs, and Creed," published in the issue of the *South African Journal of Science* for last February. It contains a very complete account of the practice of circumcision, which is the leading part of the tribal initiation rite. A remarkable feature in the beliefs of the tribe is the cult of an image of the sacred crocodile, carved out of a block of wood and kept in a secret mountain cave. A goat is sacrificed, and after it is cooked the soup is poured into a rude trough hollowed out in the underside of the image. The crocodile is known as "the father of the snake." The writer, on obviously insufficient grounds, compares this rite with the Egyptian legend of the contest between Horus, god of light, and Sut, god of darkness. The correct interpretation is probably to be found in a further study of the tribal myths, which is obviously desirable.

IN the issue of *Man* for June Mr. V. Giuffrida-Ruggeri discusses the relation of the Neolithic

Egyptians to the Ethiopians. His notes are not published in a form which admits of full examination, but he supposes that "the prehistoric series were, at least to a great extent, made up of Ethiopians, and that afterwards a great infiltration in the opposite direction took place; this infiltration must have been fed from the near east, that is, from Syria, the peninsula of Sinai, and the North African coast, territories already occupied by the Mediterranean race." Into the wider speculations advanced by the writer we cannot enter, but it is noteworthy that he assumes that the brachycephalic form of skull "does not imply any correlation to other physical characters. This skeletal character owes its exaggerated importance to the fact that it is very visible in the living man and in the series of skulls collected in museums, but in my opinion it is only valuable in determining varieties; therefore it has no value in joining together across the terrestrial space all those who are alike in that character."

A VALUABLE "Review of the American Moles," by Mr. Hartley Jackson, has just been published by the U.S. Department of Agriculture—No. 38 of the series on the North American Fauna. In his introduction the author discusses the habits and economic status of moles, the characteristics of the young, pelages, and moults, and variations; while further details of this kind are given under the heading of the various species. Among the many interesting details the author has brought to light in the course of his investigations is the fact that the star-nosed mole (*Condylura cristata*) accumulates fat around the tail at the approach of winter. In the matter of classification, the author objects to the system proposed by Mr. Oldfield Thomas, who recognises no fewer than five subfamilies. To be consistent, he maintains, every genus would have to be raised to the rank of a subfamily. Numerous text figures, maps, and several plates add materially to the value of this most excellent piece of work.

DURING the past year the State of California experienced more earthquakes than all the remaining States. According to Mr. A. H. Palmer (Bull. Seis. Soc. America, vol. vi., 1916, pp. 8–28), the number of sensible shocks observed was eighty-three, of which, however, only two (those in the Imperial Valley on June 22) were of destructive intensity. Except in this valley, they were most numerous in the district bordering the Pacific coast. They were entirely absent from northern California, which includes the active volcano of Lassen Peak, and only one occurred at Lone Pine (Inyo County), the seat of the great earthquake of 1872.

LASSEN PEAK is not the only active volcano in the United States (excluding Alaska), but it is described by Mr. J. S. Diller as the most active (Bull. Seis. Soc. America, vol. vi., 1916, pp. 1–7). The peak rises to a height of 10,460 ft., the oldest crater is more than a mile in diameter, and, until the end of May, 1914, it had not been in action for about two centuries. The first phase of activity lasted for about a year, and consisted of more than 150 gas eruptions from a new crater formed within the old one. In May, 1915, the second phase began; a stream of lava filled both the new and old craters, and flowed some way down the western side of the mountain. This phase culminated on May 19 and 22, when hot blasts, resembling those of Mont Pelée, descended the north-eastern slope.

THOUGH it may be long before the stratigraphy of the Philippine Isles can be correlated with that of other lands, the exploration of the country for useful products is bringing details of interest to light. Mr. W. D. Smith, in his "Geologic Reconnaissance of Mountain Province, Luzon" (*Philippine Journ. of Sci.*, vol. x., 1915, p. 177), quotes von Drasche on the definite stratification of certain uplifted coral-reefs. Von Drasche held this structure to be due to a periodic cessation in coral growth. The large part played in reef-formation by sediments intercalated between the corals is now more fully recognised. The hilly and difficult nature of the surface of the province is well illustrated. The same author deals with Panay (p. 211), where petroleum may possibly exist. Mr. W. E. Pratt, who ingenuously refers to "old" Spanish records of 1892, has an interesting paper (p. 241) on "Petroleum and Residual Bitumens in Leyte." The bitumens promise material for asphalt paving; but no large mass of porous strata is yet known in the petroleum region. The same author, in a paper on "The Persistence of the Philippine Coal-beds" (p. 289), points out encouragingly that their discontinuity is due to faulting, so that mining of the seams may some day be resumed. It should be noted that the Bureau of Science, Division of Mines, is now issuing geological maps in connection with the *Philippine Journal of Science*.

THE annual report for 1914 of the Department of Mines and Geology of Mysore gives an interesting summary of progress in the mining and geological work of that State. The Mysore gold mines well maintain their output, though the Ribblesdale section has now entered a poor zone like that once passed through in the higher levels. The air-blasts or explosions of rock owing to the relief of tension during mining, which are so unusually troublesome on the Mysore goldfield, occasioned somewhat fewer fatalities, only seventeen instead of thirty-one in the year before. No method of recognising when the rock is in this explosive condition has yet been discovered. A geological map of the State on the scale of eight miles to the inch has been commenced. Dr. Smeeth, the director, again insists that the great Kaldurga conglomerates are crush conglomerates and not of sedimentary origin, a view for which the evidence has been regarded by some geologists as inadequate. He shows that many of the Mysore quartzites are intrusive into the schists, and are silicified felsites or acid quartz-porphyries. In the hope of developing the iron industry in the State the iron ores have been further studied, and Dr. Smeeth publishes a valuable report upon them. He classifies them into five groups; they include banded ironstones; ores of magmatic origin in the ultra-basic rocks and in the charnockite series, of which the latter are low-grade quartz-magnetite ores; and also various replacement ores in schists. This last group includes those which appear most likely to be of commercial value.

THE recent presidential address delivered by Dr. A. W. Rogers before the Geological Society of South Africa gives an interesting description of the geology of the copper deposits of Namaqualand. He shows that the deposits of economic importance are those associated with igneous intrusions in gneiss, and thus fall into line with many of the important copper deposits in other parts of the world. The most widely distributed of these igneous rocks is mica-diorite, which is well developed at Ookiep, where, as is well known, the most important of the Namaqualand copper mines is situated. Next in importance comes norite, which appears to be of a very variable composition, ranging from rocks that differ only from the mica-diorite by the presence of a little hypersthene to rocks so rich in the latter mineral as to be almost capable of being classed as hypersthenites. Hornblendites also occur, but appear not to be associated with copper deposits to the same extent as the two first-named. It will be noted that the igneous rocks are of a decidedly basic type and that they are rich in magnesian minerals, although the absence of olivine forms a constant and interesting feature in their mineralogical composition. The igneous intrusions assume many different forms, such as dykes, pipes, sheets, and irregular bodies, but no true batholites have yet been met with. No fewer than 344 such intrusions have been mapped up to the present. Very many of these rocks show a certain admixture of sulphide, including copper sulphide, in the form of interstitial grains. The question whether these sulphides are or are not original constituents of the rocks does not admit of any very precise answer, but must be decided by a review of the whole of the phenomena characterising these occurrences. Dr. Rogers concludes, upon the whole of the evidence, that the copper deposits are magmatic segregations; that "the intrusions were complex bodies of two or more differentiates from one magma basin"; that each differentiated portion of the magma held a certain quantity of sulphides at the time of intrusion; and that these sulphides often collected together within the individual differentiates, and that they were further able to migrate and to impregnate the country to a distance of a few feet from the contact. The paper forms an interesting contribution to the study of magmatic ore deposits, a group to which increasing attention has been devoted during recent years.

The geographical problems in boundary marking are discussed by Sir Thomas H. Holdich in the *Geographical Journal* for June (vol. xlvii., No. 6). Sir T. H. Holdich has had a great deal to do with frontier delimitations in India and South America, and no man is better qualified to speak on the subject and to direct attention to the necessity of geographical knowledge on the part of the statesmen who decide frontiers. The paper gives many instances of complications, needless expense, and the threat of war due to ignorance of geographical conditions or the misapplication of geographical terms. The question will soon be one of vital importance. It may be too much to hope that expert geographical advice will be sought at least in the wording of frontier treaties, but it is nevertheless not an unreasonable demand to make.

Mr. O. F. Cook gives an interesting account of agriculture and native vegetation in Peru in the Journal of the Washington Academy of Sciences, vol. vi., No. 10, May, 1916. Mr. Cook deals particularly with the region around Cuzco, the chief centre of the Inca and pre-Inca civilisation. He points out that the present distribution of the principal types of vegetation is not a natural effect of altitudes, climates, or soils, but an artificial result of intensive agricultural occupation of land over a long period of time. The primeval forest which probably clothed the hills has, in his opinion, been everywhere destroyed for agricultural purposes, and the forests which are now found are of secondary origin, having sprung up on land which has gone out of cultivation. The absence of palms in such forests is cited in support of this view. He considers that the denudation of the higher land formerly under cultivation has given rise to the large areas of grass land now sterile and abandoned.

The Optical Society, 39 Victoria Street, Westminster, has reprinted in pamphlet form, at the price of a shilling, the paper on the manufacture and testing of prismatic compasses read recently before the Society by Mr. F. E. Smith, of the National Physical Laboratory. It describes the methods adopted at the laboratory to test the instruments for the possible errors, and gives sufficient details to enable any maker to set up without great expense his own testing arrangements. In addition, much valuable information is given as to the best form of needle, the best shape of the hard steel pivots, the superiority of garnets to agates as jewels, the proper degree of hardness of the needle (secured by the faintest straw colour in tempering), the advantage of magnetising the needles in coils giving a magnetic field of 400, and the superiority of a dead-beat motion of the needle, secured by the use of liquid, air, or magnetic damping. In practical use Mr. Smith thinks it advisable to tap the compass gently to give the needle the best chance of taking up a correct position. He finds many of the compasses at present made cannot be trusted to half a degree.

Bulletin No. 59 of the Technological Series of the Bureau of Standards gives an account of an investigation of standard test specimens of zinc-bronze (Cu 88, Sn 10, Zn 2) by C. P. Carr and H. S. Rawdon. The authors conclude (*a*) that the addition of the small percentage of zinc does not affect the theoretical microstructure of the alloy; (*b*) that the method of casting, pouring temperature, etc., affect the structure only indirectly by influencing the rate of cooling, amount and distribution of "enclosures," etc.; (*c*) that the microstructure offers an explanation for the characteristic appearance of the tensile bars after testing; and (*d*) that of the various microstructural features affecting the physical properties, oxide films must be considered to exert by far the greatest influence. The best type of test bar where the metal is to be cast into sand is the cast-to-size shape, and if the metal is poured anywhere in the range 1270–1120° C. uniformity of tensile strength and ductility are obtained. The advantages of the cast-to-size shape are that it is easy to mould and inexpensive to machine into the shape and size required for testing. It is recommended as the form which should be adopted as standard for general foundry practice.

Considering what a fundamentally important substance it is, and the fact that it is frequently used in molecular weight determinations, one would have thought that trustworthy data for the melting and solidifying points of benzene would have been recorded long ago. From an article by Mr. R. Meldrum in the *Chemical News* for June 9, however, this does not seem to be the case. With the most nearly pure benzene commercially procurable, which was solidified at 3° C. for twenty-four hours, and then drained, this author obtained 3·92° and 3·95° C. as the solidifying point. The rate of crystallisation at this temperature, however, slackened very considerably after 10 per cent. had solidified. For the melting point, determined by keeping the thermometer immersed in the melting crystals, the value obtained was 4° C. Using the crystals solidified from the sample, after pressing between filter paper at 3° C., the author found 5·6° for the solidifying point and 5·7° for the melting point. Benzene kept in a tube of 1-in. bore at a temperature of 1° C. solidified without crystalline structure, and hence was probably in the colloidal condition. Mr. Meldrum concludes that above the melting point benzene exists in more than one modification.

There has just been completed on one of the main lines of the Great Central Railway a bridge over one of the English rivers (which cannot be named for military reasons) having a Scherzer rolling-lift opening span weighing 2900 tons, the largest in this country, if not, indeed, in the world. An illustrated account of this bridge appears in *Engineering* for June 23. The bridge was designed by Mr. T. B. Ball, the engineer of the railway company, and provides for a double line of railway and for a broad road bridge, with footpaths parallel to the railway track. The lifting span gives a clear waterway 150 ft. in width. The operating gear is provided with two electric motors, each of 115 horse-power, and these are connected by gearing to the main gudgeon pins at the outer girders. The bridge is accurately balanced, with a slight preponderance to the nose end in order to prevent hammering on the bearings. The gear is sufficiently powerful to operate the bridge against a 20-lb. wind, and the time for opening, or closing, is three minutes. The bridge was constructed by Sir William Arrol and Co., Ltd., of Glasgow.

OUR ASTRONOMICAL COLUMN.

Comet 1915*e* (Taylor).—Messrs. Jeffers and Neubauer, of the Berkeley Astronomical Department (University of California), have calculated elements and ephemeris for this comet. Three normal places were formed from the observations, 1915, December 5–10; 1916, January 7–11 and April 5, the latter being photographic (Lick Observatory Bulletin, No. 281). The new orbit agrees very closely with the Copenhagen calculation (Nature, March 16; see also issue for February 17):—

$T = 1916$ Jan. $30{\cdot}9403$ G.M.T. $\quad P = 6{\cdot}3662$ years

$\mu = 557{\cdot}3450''$

Equinox 1916·0 $\quad$ Epoch 1916 Jan. 8·5 G.M.T.

$\omega = 354^\circ\ 49'\ 01{\cdot}6'' \qquad M_0 = 356^\circ\ 31'\ 33{\cdot}0''$

$\Omega = 113^\circ\ 54'\ 05{\cdot}1'' \qquad e = 0{\cdot}546458\ (\phi = 33^\circ\ 7'\ 27{\cdot}7'')$

$i = 15^\circ\ 31'\ 43{\cdot}5'' \qquad \text{Log}\ a = 0{\cdot}535922$

The ephemeris has been calculated to August, but the comet is stated to have been only of the fifteenth magnitude early in May.

Return of Daniel's Comet (1909*e*).—According to new elements calculated by S. Einarsson and Margaret Harwood, the undisturbed time of perihelion passage is 1916, May 23·422 G.M.T., but the ephemeris shows that the comet will not be favourably situated for observation.

Variation of Latitude.—In the course of a review of this subject Prof. F. Schlesinger incidentally mentions that on account of the war the second American station of the International Latitude Service may possibly be closed down (Proc. American Philosophical Society, vol. liv., No. 220). The two American stations were Gaithersburg and Ukiah. The former has already been abandoned (Nature, March 2). An American observatory—Cincinnati—participates, but, of course, is not maintained by the international organisation.

Difference of Longitude between Paris and Washington.—Prof. Abraham's photographic method of recording wireless time signals has been tested during the past winter in the determination of the above long arc. For various reasons only seven pairs of records are available for reduction; nevertheless, comparison with the results obtained by telephonic reception is decisively favourable. M. Baillaud (*Comptes rendus*, No. 24) states that the Bureau of Longitudes has come to the conclusion that for the determination of longitudes over distances too great for the transmission of very short signals the only method which can be employed with success is that of photographic registration.

The Constitution of the Milky Way.—Prof. C. V. Charlier has published a preliminary statement of results obtained at Lund on the distribution of the helium stars. The special significance of this group of celestial bodies is due to their close and real association with the Milky Way. As it now appears that the whole class (804 stars) has been catalogued at Harvard, they afford a unique body of data for statistical investigation (*Comptes rendus*, No. 23). The luminous radiation of these the brightest and hottest of stars is such that, viewed at the limits of the stellar universe, one of them would still appear as an 8th magnitude star. The nearest of the type is 4 siriometers (1 S.M. = 1,000,000 astronomical units) distant, and the most distant 250 S.M. The centre of the group—considered to be the probable centre of the sidereal universe—is situated in the direction of Carina ($\alpha = 7{\cdot}7$h., $\delta = -55{\cdot}6^\circ$). Two-thirds are contained in an ellipsoid of revolution having axes of 37·3 and 13·1 S.M. in the plane of the galaxy and at right angles respectively.

HYDROLOGY AT THE ARCTIC CIRCLE.[1]

THERE is something mysteriously fascinating about regions which are remote from the ordinary haunts of men. The silence of illimitable wilds and the solitudes of eternal snow stir the heart and stimulate the imagination as no other field of human enterprise can do. Explorers feel the irresistible call; pioneers grope their lonely way; by degrees the trackless unknown is traced and probed and scanned, until the survey is complete and earth's secret recesses are defined as completely and accurately as an English county.

Such is the reflection which arises as one turns over the pages of the extremely interesting hydrographical record of the Yukon-Tanana region, Alaska. Lying along the Arctic Circle, hemmed in by frozen seas and peaks of ice, this great tract of 40,000 square miles has been patiently mapped out and indexed through six long years, with praiseworthy persistence and energy, by workers in the United States Geological Survey. The preface does them but bare justice when it points out that their investigations have necessitated journeys which have put their physical endurance to severe tests and entailed considerable hardship.

The Yukon-Tanana region forms part of the central plateau of Alaska. It is an upland diversified by many broad valleys, with flat, interstream areas, above which rise numerous rounded domes and mountain masses. The surface of the upland ranges from 2000 to 3500 ft. in altitude; the domes, irregularly distributed, reach 4000 to 5000 ft., and the highest mountain crests to 6000 ft. high. The domes are almost entirely composed of igneous rocks, and the mountains of these and closely folded sediments. As a geological field, the country is one of great interest; it is a region of sedimentation, diastrophism, widespread metamorphism, abundant intrusion, and volcanic action.

The rocks may be divided into two principal groups: one consisting of metamorphic schists of pre-Ordovician origin, and the other, ranging in age from Ordovician to Carboniferous, made up of folded argillites, quartzite, conglomerate, sandstone, and limestone, resting unconformably in relation to the schists. Igneous rocks are represented by areas of granite and by dykes of varied composition. The most notable mineral resource of the country is placer gold, the developed deposits of which lie chiefly among the elder schistose and intrusive rocks. Silver, antimony, silver-lead, and tin ores are also worked.

As might be expected, the climate is one of extremes.

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[1] "Surface Water Supply of the Yukon-Tanana Region, Alaska." By C. E. Ellsworth and R. W. Davenport. (Water Supply Paper No. 342.) Pp. 343, with maps, photographs, and diagrams. (Washington: United States Geological Survey, 1915.)